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Technological Adaptations of Abaknon Fishers In Capul, Northern Samar: How Ocean Currents Contribute To Resourcefulness And Transformation

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Abstract

This paper investigated the livelihood strategy of the Abaknons and its effects on the coastal subsystem. Abaknons, the local people of the small-island of Capul, Northern Samar take advantage of the windswept and whirlpool-dotted strip of rushing sea San Bernardino Strait, hemmed in by the western current from the Pacific Ocean and the eastward current from the China Sea. This paper examines how a traditional fishing community transforms its fishing technology by re-inventing the varied non-biodegradable discards brought by such ocean currents to the shores of Capul. The opportunities offered by these throw-aways heighten the resourcefulness of the Abaknons, resulting in other transformations triggered by this seemingly small change.

Keywords: Technological adaptations, ocean currents, resourcefulness, transformation

Introduction

Similar to any small-island in the Philippine archipelago, Capul and its islanders, the Abaknons are dependent on farming and fishing for their major sources of livelihood.

Their fishing methods and gears are usually designed and practiced in consonance with their local knowledge systems, community practices and the natural system for adequate productivity to meet the needs of the community as well as to revitalize the ecosystem.

Through time people have changed their fishing gears and methods. Their deep knowledge of the biophysical environment, their fishing system that evolved in adaptation to environmental conditions has helped them arrive at having more catch and conserve the resources of the ecosystem. To sustain this way of life, people have devised their own calendar of activities based on sensitivity to the changing biophysical environment.

This study showed how the local people in an island ecosystem have adapted their fishing practices to the natural occurrences most especially the sea currents as the result of the confluence of the rushing current from the San Bernardino Strait and the Pacific Ocean. It highlighted the knowledge and practices of the Abaknons and how they live within the limits of the island resources. The knowledge and practices related to fishing reflect how the local people adapt their lives to climate and other environmental conditions.

This paper further highlighted how the Abaknons have adapted their fishing methods and gears/technology to climate and other environmental conditions and how they make use of the throw-aways that the current has brought to the coast of the island.

More specially, this paper 1) described the fishing methods and gears used by the Abaknons; 2) described how the current contributes to the innovations of their fishing gears; 3) assessed the productivity of the gears and methods in terms of CPUE.

Methodology

The Small-island of Capul, the Locale

The island dealt in this paper is the island town of Capul in the Province of Northern Samar. In terms of its land area, the island has 3,500 hectares that accommodate 12,343 human populations. Originally named **Abak**, the people of Capul are called **Abaknons** whose language **Inabaknon** is unique in which linguists classified it as a Sama language of Mindanao rather than a Visayan language.

Geographically, Capul lies at 124^{o} and 10” E longitude and 12^{o}N latitude. The island is bounded by the San Bernardino Strait on the north, San Vicente on the south, Allen on the east and the Province of Masbate on the west. It is part of the eastern Seagate of the Philippines to the Pacific Ocean. It is situated in the middle of a windswept and dangerous whirlpool-dotted strip of rushing sea San Bernardino Strait hemmed in the western current from the Pacific Ocean and the eastward current from the China Sea.

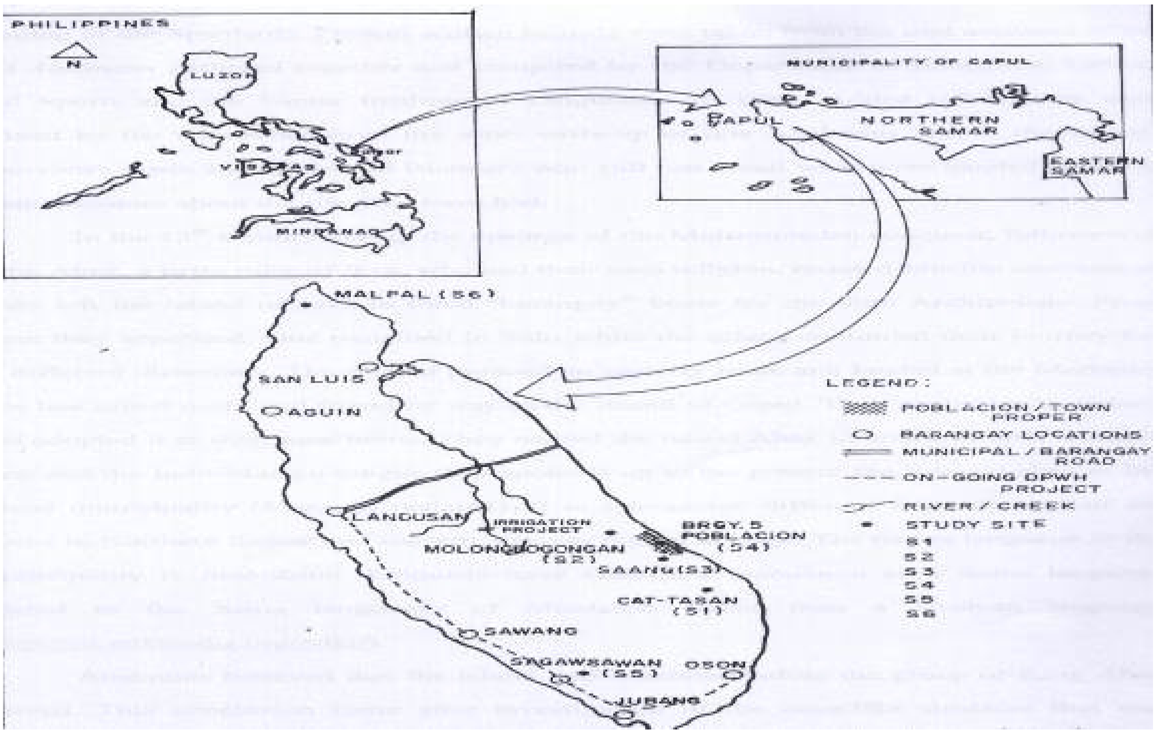

Figure 1. Map of the Philippines locating Northern Samar, San Bernardino Strait, Pacific Ocean and South China Sea.

Methods Used:

The study was conducted from January to December of 2007. Using a mix of qualitative and quantitative methods of data collection and analyses, the productivity, adaptive transformation and inventiveness were determined by the catch per unit effort of the re-invented and other fishing gears and methods of the islanders.

More specifically, it used the following data collection procedures

- Interview
- Observation
- Focused group discussion
- Fish productivity measurement

Results and Discussions

Calendar of Abaknons Livelihood Activities

Generally, farming and fishing are year-round activities of the islanders. Both farming and fishing are seasonal. Time for fishing depended on the season and flow of the current. Ordinarily, April to November is devoted to fishing using *taklob* (basket traps) while December to March is for upland farming. Farming and fishing are in some instances combined with almost equal time, fishing at night time and farming during the day.

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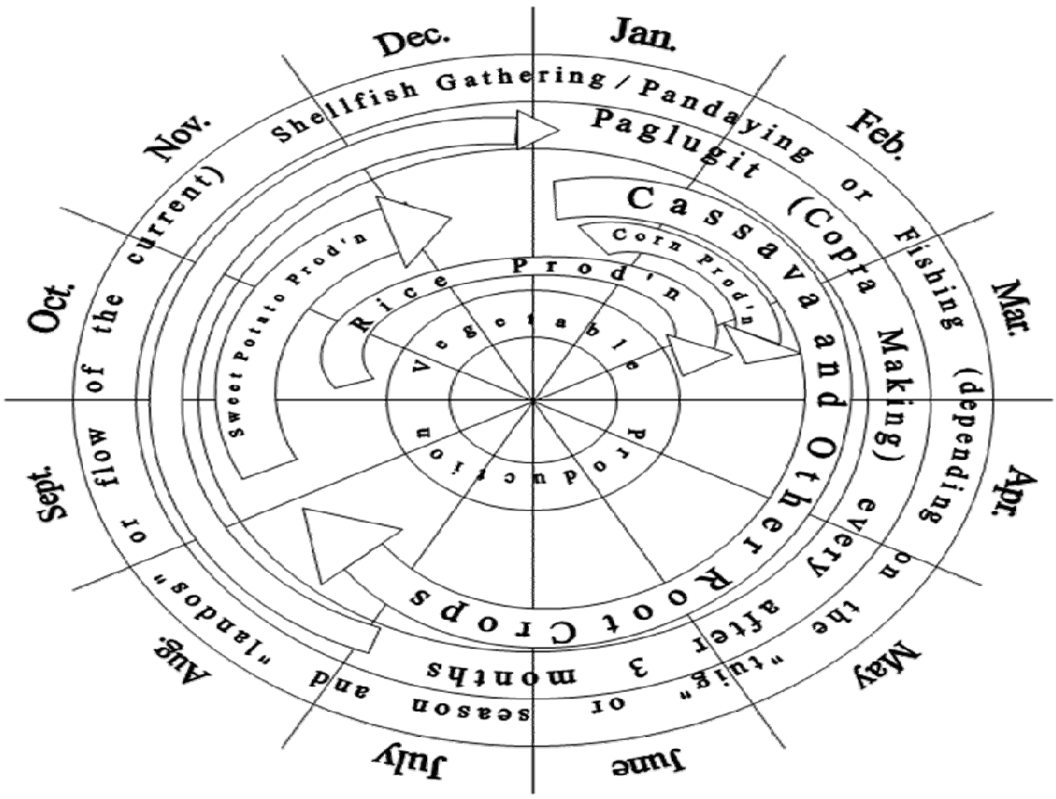


Figure 2. Abaknon calendar of the livelihood strategy activities

Season. March to August are most fit for fishing while from October to February fishing activities are at times affected by strong winds and rough seas caused by monsoon winds and typhoons. Interviews further revealed May as the best month for fishing. To them, fishes during this month undergo *pagbiyod* (spawning). Though inclement weather usually occurs during the "ber" months, the sea current when it is calm offers double opportunities for fishing. *Humugot* (low tide and the current is towards the lighthouse or towards San Bernardino Strait; the current is fit for fishing) is observed twice, i.e. more or less five hours in the afternoon and the same number of hours in the evening. Local fishers also consider the phase of the moon as indicator. Most fit also is during *katallo luyo si kawara* (few days before the last quarter) and *kaodto si kadayaw* (few days before the full moon). The passing on the knowledge of the elders also includes their knowledge on *tuig* or season, *landos* or flow of the current, which may improve fishing efficiency.

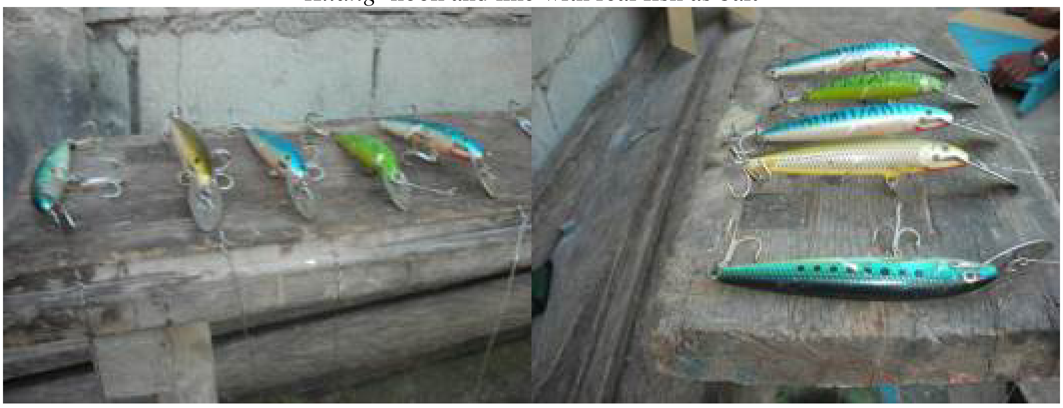
Gear used varied with the experience and the investment capital of the fishermen, and the motive of having more catch to satisfy the needs of the family. The variation of the fishing gear may range from the traditional and less expensive to the more sophisticated and expensive gears.

Season and weather influence the behavior of the fishermen with respect to target species, methods and gears used for fishing. The fishermen based their choice of fishing gear on their knowledge of the gear, the ease of the use, initial cost, and seasonality, and are no longer solely influenced by tradition (Mangi, et al., 2007). The skills in making traditional fishing gears were handed from the elders and the modern ones are patterned after the fishermen of the nearby municipalities and their ingenuity triggered and enhanced by the availability of materials brought by current, essential for transformation to good quality artificial baits, lures and/or terminal tackle.

Fishing methods and gears. Depending on the *tuig* (flow of the current and season), fishing gears used may also differ. The different fishing methods and gears the fisherfolks used were the following:

Pamangaraw (hook and line fishing) is a method for fishing that uses kook/s and line. This comes in three ways, using hook and line just on the shoreline or on waist-deep, the other way is using a non-motorized banca and the third is with the use of a motorized banca. Hook and line shoreline/coastal fishing, can either be handline or hook and line with bamboo stick. Handline fishing is purely hook and line and the line is hand held as the name implied while the latter is hook and line but the line is tied in a curved bamboo stick, more or less two meters long. As the materials are common and simple, this is the least expensive among the hook and line fishing method and the least damaging fishing method. Damage to fish and habitats through removal of high proportion of juvenile fish is minimized and direct coral damage is avoided (Mangi, et al. 2007). On the other hand, hook and line fishing using a non-motorized banca is done in a little deep sea more or less 10 to 20 meters. The size and kind of the fish catch differ in every method under the hook and line. *Pamangaraw* can be done either in the day or nighttime depending on the *tuig* or season. Hook and line using a motorized banca can be in the form of *kitang, lagolo, or rambo* (Fig.3). These require high initial costs; however, fisher gets a large return from the usual big catch.

Kitang hook and line with real fish as bait



Hook and line fishing "lagolo" with artificial bait rapala

Figure 3. Islanders' common gears and methods.

Kitang (Fig. 3) is relatively an expensive method. This needs motorized-banca, a long and big fishing line (main line), usually a thousand meters in length. A hundred to a hundred and fifty hooks are singly tied on a one-meter long line and then tied to the main line. Each hook has real fish bait which is simultaneously dropped, in deep sea. After several minutes or depending on whether the line is too hard to pull which means more fish eat the bait and are hooked, the main line is pulled towards the banca. *Kitang* is expensive because the hooks and the line alone cost more than two thousand pesos (Php 2,000.00) and the bait for single-day fishing costs five hundred pesos to a thousand pesos. However, fisherfolks revealed that the initial capital is equivalent to the price of only one big fish caught. Profitable as it may because of more fish catch, only few fisherfolks engage into it because of the high initial cost.

Lago'lo' (Fig. 3), is similar to an ordinary *pamangaraw*, it differs only on the bait used and how the bait is dropped. The bait is an artificially carved fish called *rapala* tailored just like a real small fish with two hooks on it. This is dropped using a stone as big as a child's basketball, more or less three inches in diameter. Continuously, it is dropped down the bottom of the sea and pulled upon reaching a desired depth to drop the stone, leaving the *rapala* (Fig. 3) in the fishing line. The fishing line is pulled once felt that a fish eats the bait and is hooked in it. A sack of stones or more is used in a day of *lagolo* fishing. The impact of the dropped stone with the *rapala* poses threat to the coral reef and the more or less one sack addition changed the fish habitat structure and would make the water in the area shallow. This method protects the juvenile fishes as most of the catch is big and mature fishes (In-Fisherman 2007).

Rambo is another fishing method also similar to an ordinary *pamangaraw*. This uses either a non-motorized or a motorized banca, and a fishing line. Its bait is not a fresh fish but a shrimp-like lure made of wood artificially carved, and beautifully painted that in a distance it really appears like a real shrimp. The hooks are placed at the tail and middle-back of the *rambo*. The terminal tackle or the lure in the form of artificial shrimp is called *rambo* usually double the size of the real shrimp. Such creativity of the design lures big fishes and squids and ensures more catch, thus more income for fisherfolks. Using these artificial baits is not a dumb luck; it is a science of deception (In-Fisherman 2007).

Trap fishing comes in various forms depending on the gear used. *Timing-timing* (small trap for small fishes) is a fishing gear made from *mamban*, a wild small fishes to enter but once trapped could not go out anymore. Mosses from the coastal zone are used as bait, which are clipped at the bottom of the gear to attract fishes. This small gear, usually one foot in diameter, is used during summer and good for low-income fisherfolks as this does not need a banca. The *timing-timing* is carried overhead and is dropped in a desired depth, usually one to two meters deep.

Taklob is another basket-like fish trap comparatively three times bigger than the *timing-timing*. The design and depth of dropping depends on the desired fish species.

Direction or flow of the current guides or directs the dropping of the lure or terminal tackle or simply the hook and line gear, trap and net. The best dropping time is during *humugot*, when the current is from the Pacific Ocean towards the San Bernardino Strait or during *tumaob* when the moon is about to set. A fisherman's *taklob* is dropped in one setting. During the months of August to February when the sea is rough but still tolerable for fishing, placing the *taklob* in the *turis* (gully) during nighttime is a mechanism to safekeep the gear from strong waves.

Bobo is another fish trap, which uses the same materials with the timing-timing and *taklob* however; it is weaved in a rectangular shape. In size, it is twice bigger than the *taklob* or even more. Such type of trap requires less time and effort as this used no bait. Monitoring and taking off the catch need less time too, as it is done twice in a week only. The gear is dropped 15 to 20 meters deep and allows mosses to grow. Such depth of dropping minimizes coral disturbance. Tying and some other essential construction materials can be gathered from the drifting materials.

Figure 4. *Taklob*, *timing-timing* and *bobo*.

Pamana or speargun fishing is a method which can be done during day and night time. It uses a *pana* (a metal rod one to two meters long triggered by a wooden gun-like structure), *antipara* (goggles), and to some, *panyapak* or flippers. Improvised flippers are made either from wood or plastic materials and rubber to hold tightly to the feet. All materials can be taken from drifting wastes from the sea. When done during the nighttime, this method uses flashlight wrapped with rubber to avoid leakage of water in it.

The method fits the low and even the lowest profile fisher. Qualitative estimation revealed such method to be the cheapest. Spear guns require low initial costs when purchasing, low labor input when making, low labor input and no cash input in maintaining them and no boat is required. However, spearguns are associated with high labor input when using them and require relatively longer time fishing. The islanders however, designed *panyapak*, an improvised flipper to make swimming easier. From a fisher's point of view, it is the most attractive gear to use as they do not invest in gear and boats, however, it is also the most damaging to fish and habitats as it showed removal of high proportion of juvenile fish and a high rate direct coral damage per unit catch and unit area (Mangi et al. 2007).

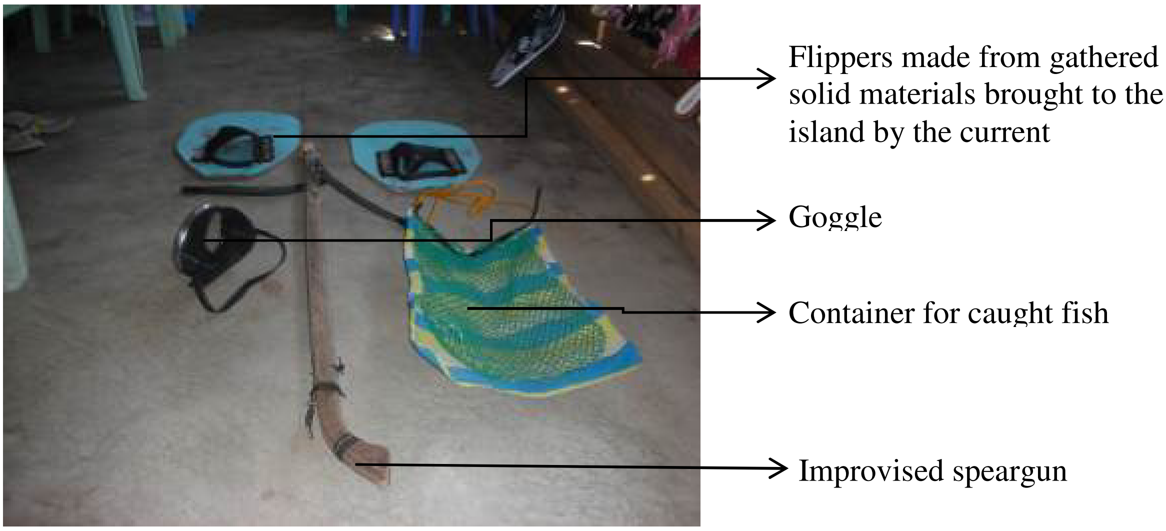


Figure 5. Paraphernalia in *pamana* or speargun fishing

Pokot, tagata, and *pamurugkas* are similar in structure and are generally called fishnets. They only differ in the size of the mesh and the species of fish the net is intended to catch. The *pokot* has a square inch mesh and is intended to catch any fish found in a 3 to 5-meter deep sea. *Pokot* with a bigger mesh size and longer than an ordinary one is dipped in an open sea and intended to catch big fish. It has a relatively high catch, large crew size and per capital returns compared to other types of nets. *Tagata* is netted in such a way that each mesh would not allow a fish as big as a point finger to pass through. This gear intends to catch small coral fishes. *Pamurugkas* is used to catch *burugkas* only. The mesh is about a centimeter in diameter. All forms of nets use *pamato* (metal anchorage).

Pokot si kalaluman

tagata

pamurugkas

Figure 6. Types of nets

Investing fishnets needs huge capital for nets, boat and maintenance, however, the gear has a long life span and hence, overtime it might be a worthwhile investment. A net depending on how owners and fishers manage and take care of it can last up to more than ten years. Only the floaters can be taken from drifting wastes.

Significance of Ocean Currents

To the Abaknons, the flow of the ocean current brings a few essential indicators. First, it directs and guides the fisherfolks when, where, how and what to fish and how much time to devote for fishing. This further guides the fishers as to what fishing gear to use.

One thing more worth noting is that the current from both the Pacific Ocean and the San Bernardino Strait whose confluence is usually observed at the southern part of the island carries with it drifting materials which the islanders call "*gaod*". These materials are already wastes to some but to the islanders, these are treasures essential for designing fishing gears and reinventing their old gears. This of course is just secondary being primarily the source of some fish species and crabs whose habitats are the drifting materials.

The drifting materials used by the fisherfolks in designing their goggle (*antipar'ra*), *kulata/buros* or the handle of the spear, the *busay* or the paddle. The various types of *rambo* are also designed out of these materials. These are also good sources of materials for other designed and invented artificial baits like the piece of wood for the *rapala*, rubber and other tying materials for flippers or duck feet, goggles, floaters for *kitang* and significant materials for the float and fly fishing gear.

Figure 7. *Gaod* or drifting materials for the construction of fishing gears.

It was difficult to quantify the cost of the fishing gear and the other related equipment and tools fishers use because all found it hard to give a unit price. Some buy the materials one after the other; others get the materials and prepare the gears by themselves. Thus, qualitative assessment based on the responses in the interviews and focused group discussion was done.

Qualitative estimation of costs revealed that *pamana si kababawan* or *speargun* fishing along the coast is the method with the cheapest capital cost of fishing gear. Spearguns require low initial costs, low labor input in making and maintaining them and no boat is required (Mangi, et al. 2007), just swimming along the coasts at one to two meters deep. *Pamangaraw* or handline fishing has cheap initial cost as it needs inexpensive hook and line but getting bait entails another expense and maintenance is also costly. *Kum'prisor* or compressor fishing on the other hand is the most expensive which costs more or less hundreds of thousands; consequently, only one is presently operating in the island. If other methods are to be considered excluding this method, it was known that *kitang* with the motorized boat is the most expensive. Due to modifications of the method to suit the financial capital of the fisherfolks, this can be done using a non-motorized *banca*. The method and the kind of gear used by fisherman greatly depend on the financial potential of the fisherman and the intended type of fish to catch.

Productivity of Fishing Activity. A fish catch survey was conducted in two seasons; a season when the sea was rough and a season when the sea was calm. The survey period for each season covered the complete phase of the moon; that was, from the first quarter to the full moon for a period of 28 days. All the 10 fish buying stations in the entire island were considered in the survey. The survey revealed that the island accumulated a fish catch of 20,126 kilograms in 28 days were caught during the calm sea period. This means, the island has the potential to provide an estimated annual total of 173,935 kilograms of fish which showed that the whole island had an approximate annual fish value of PhP11, 167,157.00.

The data on fish catch provided on opportunity for the assessment of the fishery dynamics of the five municipal fishing gears of the island namely: speargun, hook and line, net, basket-like trap and compressor. These also provided an estimate of the status of the fish stock resources of the island. The data therefore are vital in the establishment of fishery management policies that would further conserve and/ or protect the biomass of the fishery resources from collapse (Maneja 2003).

Similarly, fish productivity and the status of the island's resources, catch rates of every fishing gear were monitored for 28 days both calm sea and rough sea periods. Catch per unit effort (CPUE) of every fishing gear was computed. The CPUE obtained in the study indicate the current status of fishery resources in the fishing grounds of the island (Fig. 8). It would have been far better if comparisons of the present CPUE with the previous studies be made; however, no study was conducted relative to this.

The study revealed that during the period when the sea is calm, the average CPUE of the five fishing gears is 8.27 kg/man/hour compared to the 10.89 kg/man/hour average CPUE of the same fishing gears during the rough sea period (Fig. 8). During the calm sea period, net had the highest CPUE of 24.35 while compressor had the least.

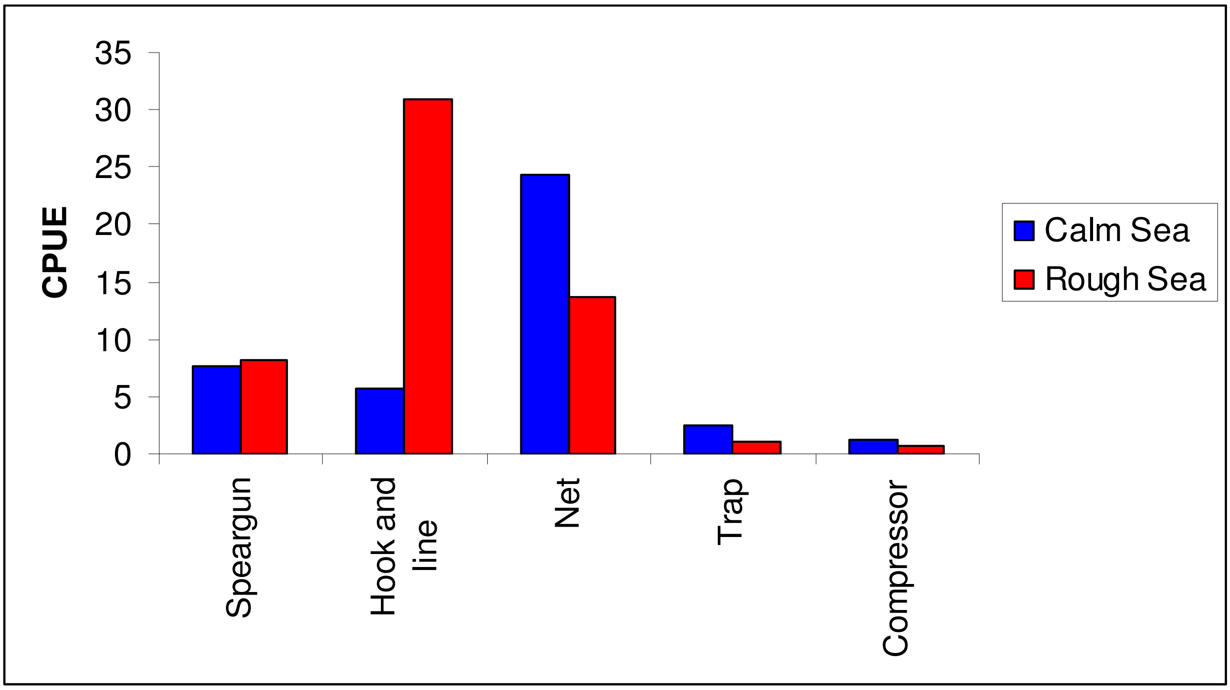


Figure 8. CPUE of different fishing methods and gears

The high fish catch using net reflects the good status of the fishery in the island's fishing ground particularly in the coral line along the coastal zone. The fish catch was dominated by the targeted fish species (particularly *Thunnus albacores* for big open-sea nets) and less of mixed catch (only in coastal nets) which means that the individual fish caught were within the accepted market size for the species which indicates good status of the fishing ground (Maneja 2003). This was further confirmed by the fact that the mesh size of the nets used by fisherfolks is dependent on the fish species they target to catch. However, there is a decline of CPUE during the rough sea period which could be due to strong flow of the current that increases effort but fish catch leveled off.

Speargun fishing came out to have a CPUE of 7.57 indicative of the good condition of the coral cover and fishery resources in the entire island. This fishing method is usually done one meter to few meters sea water deep. The increased effort due to the use of modified flippers and other gears could be attributed to the high CPUE. It was previously practiced during the day time only with no modified fishing paraphernalia. Trial and error experiences of doing speargun fishing during night time depending on the *landos* gave them more catch. Night time speargun fishing did not require much effort at some time. This they do at the neck deep sea water where they easily can stand and take a breath for rest. The gun or the *kulata* can be constructed from the *gaod*.

Hook and line is the third with the largest CPUE of 5.74 kg/man-hour during the calm sea period, however, it has the highest CPUE during the rough sea period with 30.91 kg/man-hour. This CPUE can be attributed to the various forms and styles of artificial deceiving baits, carved aesthetically and lifelike that they wiggle naturally. It also brings implications like good condition of the fish resources and the coral cover. Aside from the fishers' local knowledge of the temporal distribution of fish species, the high CPUE of hook and line recognizes the island fishers' ingenuity of designing baits. These are less expensive than when using real fish for baits and besides, artificial baits really lure and deceive fish for more catch. Each *paon* (bait) usually captures the target fish species. Proven for instance is the *rapala* that catches thigh-sized mature yellow fin; *rambo* gets the large-sized *kanoos (*squid), and a lot more. The 18.32 kg/man-hour average seasonal CPUE is far above the CPUE of the same gear in Bolinao, Pangasinan which ranges from 2.18 to 3.83 kg/man-hour (Maneja 2003), although the present study covered daily catch for one month during the rough sea period and daily catch for one month during the calm sea period while that of Maneja was done per fishing boat trip for one year.

The relatively high CPUE of hook and line and high mean seasonal CPUE of the island bring significant implications. First, is the very good present condition of the fishery resources in the island. The fisherfolks' practices like indentifying specific fishing areas for every gear, the prohibition of illegal fishing, the growing discipline among fisherfolks' group and the conduct of rituals for the gears are indeed geared towards the conservation of the marine resources in the island. Furthermore, their traditional knowledge on the sea current fit for fishing, on the life cycle and biology of the fish added to the said practices are all worth sustaining.

Conclusion

Fishing methods and gears have continuously evolved throughout recorded history. Fishers are inventive and not afraid of trying new ideas. A common way to classify these gears is based on the principle of how the fish or other preys are captured and, to a lesser extent, on the gear construction.

To the islanders, having ore catch through designing and using lures from materials brought about by the ocean current is not a dumb luck but a science of deception. Using the invented and reinvented fishing gears and technology must go hand in hand with the following secrets:

1. Visualize the underwater topography to pinpoint big catch.
2. To better visualize what lies beneath, one must study the shoreline and imagine what the sea bottom would look like without water. (The islanders' deep knowledge of the biophysical environment enables them to determine the right depth for the lure to have an assured catch).
3. Keep a sharp eye out for isolated cover, such as rock piles, sunken tires, brush and boat docks.
4. It is not just the structure of the lure that counts but the style of jerking it.
5. Use a lure that provides more versatility for changing the direction or making baits change course by sweeping the rod from one side to the other, or by using current and wind, and by manipulating the bait.
6. Multi-movements is more realistic, more of what a real baitfish does.

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